भारतीय मानक
Indian Standard

IS 17693 : 2022

क्ले से बने अविद्युतीय प्रशीतन कैबिनेट

Non-electric Cooling Cabinet Made of Clay

ICS 97.040.30

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Refrigeration and Air Conditioning Sectional Committee, MED 03

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Refrigeration and Air Conditioning Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard is based on 'Mitticool Refrigerator', exhibited at the Innovations Scholars In-residence Programme held at Rashtrapati Bhawan in partnership with National Innovation Foundation.

The composition of the Committee, responsible for the formulation of this standard is given at Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the results of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

NON-ELECTRIC COOLING CABINET MADE OF CLAY

1 SCOPE

This standard specifies the construction and performance requirement of a cooling cabinet made out of clay, which operates on the principle of evaporative cooling. These cabinets may be used to store perishable foodstuff in areas where electrical power is not available.

NOTES

1 The cooling cabinet covered in this standard operates on the principle of evaporative cooling maintaining the inside cabinet temperature, not below the ambient wet-bulb temperature.

2 These cabinets are not suitable to preserve the foodstuff which are required to be stored in frozen state.

2 REFERENCES

The standard listed here contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the edition indicated was valid. All standards are subjected to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard listed here:

IS No.	*Title*
12817 : 2020	Stainless steel butt hinges — Specification (*third revision*)

3 TERMINOLOGY

For the purpose of this standard the following definitions shall apply.

3.1 Clay — Clay is a type of fine-grained natural soil material containing clay minerals. Clays develop plasticity when wet, due to a molecular film of water surrounding the clay particles, but become hard, brittle, and non-plastic upon drying or firing.

3.2 Cooling Cabinet — It is a cabinet to cool the water as well as foodstuffs and store them for prescribed time.

3.3 Foodstuff — Food and beverages intended for consumption.

3.4 Time Period — Time during which the stored items remain usable.

3.5 Volume — Space within the inside liner of the cooling cabinet, or a compartment or sub-compartment.

4 SIZE

The size of the cooling cabinet refers to the external dimensions of the cooling cabinet.

NOTE — Variation of ± 3 percent in overall dimensions may be accepted.

5 CONSTRUCTION

Following guidelines shall be followed for the construction of the cooling cabinet.

5.1 Main Body

Main body shall be constructed with clay.

5.2 Door

The door shall be constructed of metallic/non-metallic material and fixed on the cabinet by stainless steel hinges conforming to IS 12817 or similar non-corrosive material.

5.3 Tap

Chrome plated tap shall be used to draw water from the cooling cabinet.

5.4 Stand

The stand of the cooling cabinet shall have sufficient strength and shall provide stability to the cabinet. The legs of the stand shall be such that the space below the cabinet can be cleaned easily. To check the stability, the cooling cabinet along with its stand is tilted at an angle of 15^{o} in all directions and it shall not overturn.

6 COOLING PERFORMANCE EVALUATION

6.1 General

As the cooling cabinet functions on the evaporative cooling principle, the cooling effect will be more when the difference between dry-bulb temperature (DBT) and wet bulb temperature (WBT) is more.

6.1.1 *Test Condition*

The performance shall be examined as below and stored water temperature shall not be more than 28 °C. To provide the appropriate ventilation, the air velocity around the cabinet shall be between 1 m/s to 2 m/s with airflow direction from top to bottom and the temperature gradient in the test lab at every height of 1 m shall be less than 1.0 °C.

6.1.2 *Test Method*

To determine the characteristics of a cooling cabinet made of clay, as per this standard, it is necessary to measure the temperature for a representative period of steady-state operation that complies with the relevant requirements.

These values are measured at specified ambient temperature 32 ± 1 °C for cooling performance determination.

To assess whether a proposed period of test data is acceptable for the determination of cooling performance, the data are analyzed and examined to assess whether changes in internal temperatures are within acceptable limits. Steady-state internal temperature determination where the change in cabinet internal temperature is within ± 0.5 °C between the two consecutive temperature readings at an interval of 15 min.

After achieving the steady-state condition, at least 7 internal temperature readings shall be taken.

Cooling effect shall be calculated as follows:

Cooling effect = Ambient DBT – Cabinet internal DBT

Where, DBT is dry bulb temperature.

7 VOLUME DETERMINATION

The volume of each compartment of the cooling cabinet appliance shall be determined as in **7.2**.

7.1 General

All measured compartment volumes shall be rounded to the nearest 0.1 l. The total volume shall be the sum of these rounded compartment volumes and the declared value for total volume shall be rounded to the nearest whole litre.

7.2 Determination of Volume

The volume shall take into account the exact shapes of the walls including all depressions or projections.

NOTES

1 For the cooling cabinet with water dispensers, the water storage space shall be included in the volume up to the dispensing function.

2 When the volume is determined, internal fittings such as shelves, removable partitions, containers, and any interior shall be considered as not being in place.

7.3 Rated Total Volume

The measured total volume shall not be less than the rated total volume by more than 3 percent of the latter or 1 l, whichever is the greater value.

8 CLEANING

To obtain effective cooling, the cabinets shall be cleaned frequently as per the manufacturer's recommendation.

9 MARKING

9.1 Each product shall have the following information marked in a permanent and legible manner on one or several locations where it is readily accessible:

a) Name and address of manufacturer;
b) External dimension; and
c) Gross volume.

9.2 BIS Certification Marking

The product conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the product may be marked with the Standard Mark.

10 PACKING

The product shall be packed in suitable packing so that it does not get damaged during transportation and handling.

User manual shall also be provided with the product indicating the type of food stuff which can be stored in it along with time.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Refrigeration and Air Conditioning Sectional Committee, MED 03

Organization	*Representative(s)*
Indian Institute of Technology, Roorkee	Prof (Dr) Ravi Kumar (***Chairman***)
Annapurna Electronics and Services Ltd, Hyderabad	Shri G. K. Prasad Shri J. S. Sastry (*Alternate*)
Bureau of Energy Efficiency, New Delhi	Shri Sameer Pandita Shri Kamran Shaikh (*Alternate*)
Blue Star Ltd, Mumbai	Shri Jitendra Bhambure Shri Sunil Jain (*Alternate*)
BSH Household Appliances Manufacturing Pvt Ltd, Chennai	Shri Vijaya Kumar Loganathan Shri Anand Balasubramanian (*Alternate*)
Carrier Aircon Ltd, Gurugram	Shri Bimal Tandon Shri D. Bhattacharya (*Alternate*)
Central Power Research Institute, Bengaluru	Shri A. R. Ravi Kumar Shri Gujjala B. Balaraja (*Alternate*)
Centre for Science and Environment, New Delhi	Shri Chandra Bhushan
Danfoss Industries Pvt Ltd, Gurugram	Shri Madhur Sehgal Shri K. L. Nagahari (*Alternate* I) Shri M. N. S. V. Kiran Kumar (*Alternate* II)
Electrical Research and Development Association, Vadodara	Shri Gautam Brahmbhatt Shri Rakesh Patel (*Alternate*)
Emerson Climate Technologies(India) Pvt Ltd, Karad	Shri Chethan Tholpady Shri D. P. Despande (*Alternate*)
Godrej and Boyce Manufacturing Company Ltd, Mumbai	Shriburzin J. Wadia Shri Abhijit A. Acharekar (*Alternate*)
Honeywell International India Pvt Ltd, Gurugram	Shri Sudhir Kavalath Dr Nitin Karwa (*Alternate*)
Indian Institute of Chemical Engineers, Kolkata	Dr D. Sathiyamoorthy Dr Sudip K. Das (*Alternate*)
Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE), New Delhi	Dr Jyotirmay Mathur Shri Ashish Rakheja (*Alternate*)
Ingersoll Rand, Bengaluru	Shri Mittakola Venkanna Shri Jeya Prakash Gurusamy (*Alternate*)
International Copper Association India, Mumbai	Shri Sanjeev Ranjan Shri Shankar Sapaliga (*Alternate*)
Intertek India Pvt Ltd, New Delhi	Shri Balvinder Arora Shri C. M. Pathak (*Alternate*)
L G Electronics India Pvt Ltd, New Delhi	Shri Aditya Anil Shri Rajat Shrivastava (*Alternate*)
National Thermal Power Corporation, Noida	Shri D. K. Suryanarayan Shri S. K. Jha (*Alternate*)
Refrigeration and Airconditioning Manufacturers Association, New Delhi	Shri Gurmeet Singh Shri R. K. Mehta (*Alternate*)

Organization	*Representative(s)*
Samsung India Electronics Pvt Ltd, Noida	Shri Gaurav Choudhary Shri Kalicharan Sahu (*Alternate*)
Sierra Aircon Pvt Ltd, Gurugram	Shri Devesh Mudgal
The Chemours India Pvt Ltd, Gurugram	Shri Vikas Mehta Shri Nishit Shah (*Alternate*)
UL India Pvt Ltd, Bengaluru	Shri V. Manjunath Shri Satish Kumar (*Alternate*)
Voltas Ltd, Mumbai	Shri Srinivasu Moturi Shri A. D. Kumbhar (*Alternate*)
Voluntary Organization in Interest of Consumer Voice, New Delhi	Shri H. Wadhwa Shri B. K. Mukhopadhyay (*Alternate*)
In personal capacity (*506/2, Kirti Apartments, Mayur Vihar, Phase-1 Extension, Delhi*)	Shri P. K. Mukherjee
In personal capacity (*H.No. 03, Savita Vihar, Delhi*)	Shri J. K. Agrawal
BIS Directorate General	Shri Rajneesh Khosla, Scientist 'E' and Head (MED) [Representing Director General (*Ex-officio*)]

Member Secretary

Ms Khushbu Jyotsna Kindo
Scientist 'C' (MED), BIS

Panel on Non-electric Cooling Cabinet Made of Clay Material

Organization	*Representative(s)*
UL India Pvt Ltd, Bengaluru	Shri V. Manjunath (***Convener***)
Consumer Electronics and Appliances Manufacturers Association, New Delhi	Shri Rohit Kumar Singh
Blue Star Ltd., Mumbai	Shri Sunil Jain
In personal capacity (*H.No. 03, Savita Vihar, Delhi*)	Shri J. K. Agrawal
In personal capacity (*F-88, Abdul Fazal Enclave, Jamia Nagar, New Delhi*)	Shri S. T. H. Faridi
Voltas Ltd, Mumbai	Shri Srinivasu Moturi
Voluntary Organization in Interest of Consumer Voice, New Delhi	Shri H. Wadhwa Shri B. K. Mukhopadhyay (*Alternate*)

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